



NIH Trainee Workshop

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National Center for Medical
Rehabilitation Research (NCMRR)

National Institute of Child Health and
Human Development (NICHD)
National Institutes of Health (NIH)





NIH is made up of 27 Institutes and Centers

Including:

NINDS (Neurological Disorders & Stroke) e.g., spinal cord & brain injury, cerebral palsy

NIAMS (Arthritis & Musculoskeletal & Skin) e.g., muscle physiology, bone & skin

NIA (Aging) e.g., geriatric populations

NINR (Nursing Research)

NCI (Cancer)

NHLBI (Heart, Lung & Blood) e.g., exercise, cardiovascular

NIMH (Mental Health) e.g., behavioral, social, emotional disorders

NIDCD (Deafness & Communication Disorders) e.g., speech, balance

NIDDK (Diabetes, Digestive and Kidney) e.g., urinary track, diabetic complications

NCCAM (Complementary and Alternative Medicine)

NIBIB (Biomedical Imaging and Bioengineering)



... and the **NICHD**

(Child Health and Human Development)

Which has the **National Center for Medical Rehabilitation Research (NCMRR)**

- Established 1990 by Public Law 101-613
- MISSION: To foster development of scientific knowledge needed to enhance the health, productivity, independence, and quality of life of persons with disabilities



What's Hot in Medical Rehab?

Disorders and Conditions

Clinical Issues

Secondary Complications

Cognitive and Behavioral issues

Neurological Strategies and Mechanisms

Therapeutic Approaches

Children and the Developing Brain

Bioengineering

Assessment and Outcomes



Disorders and Conditions

- Neurotrauma (e.g., traumatic brain injury, spinal cord injury, amputation)
- Stroke and other hypoxic/ischemic insults
- Neurodevelopmental disorders (e.g., cerebral palsy, post-polio)
- Neurodegenerative Disorders (e.g., multiple sclerosis, parkinson, muscular dystrophy)
- Non-neuromuscular disorders (e.g., arthritis, cancer, diabetes)



Clinical issues

- Weakness and paralysis, spasticity, tremors
- Movement disorders: balance, coordination, gait
- Pain and sensory dysfunction
- Autonomic dysreflexia
- Bowel and bladder dysfunction



Secondary Complications

- Musculoskeletal changes: muscle atrophy, osteoporosis
- Skin ulceration and breakdown
- Connective tissue dysfunction
- Increased susceptibility to infection
- Increased morbidity and mortality
- Recurrence risk



Cognitive and Behavioral Issues (especially head injury)

- Executive function (decision making)
- Attention (both temporal and spatial)
- Cognition and memory
- Visuospatial perception
- Communication disorders: speech, language, hearing
- Aggression
- Depression
- Drug addiction and alcoholism



Neurological Strategies and Mechanisms

- Prevention and reducing recurrence
- Improved diagnosis and prognosis
- Reducing initial pathology
- Minimizing collateral damage
- Reducing inflammation and scarring
- Promoting regeneration and neuroplasticity
- Adaptation and activity-mediated changes



Therapeutic Approaches

- Addition of exogenous genes, cells, tissues
- Trophic factors and pharmacological agents
- Activity-mediated changes
- Promoting angiogenesis
- Therapeutic exercise and cardiovascular fitness
- Gender differences and role of hormonal factors



Children and the Developing Brain

- Increased vulnerability, but also increased potential for plasticity and recovery
- Growth trajectory: rapidly changing physical and behavioral repertoire
- Disorder can impede future development; concept of “Critical periods”
- Children react differently to trauma: physically, psychologically, emotionally
- Unique sensitivity to pharmacological and other therapeutic approaches



Bioengineering Research

- Orthotics, prosthetics, and other assistive devices
- Neuroprosthetic devices
- Functional electrical stimulation (FES) and transcranial magnetic stimulation
- Brain imaging (fMRI and PET)
- Robotics to provide therapy or improve diagnosis
- Wheelchairs and other mobility aids
- Control of environment
- Speech, language and communication aids



Assessment and Outcome issues

- Importance of working across the domains of pathology, function, disability
- Improved diagnostic and prognostic measures
- Assessment of function and disability
- Participation (family, community, employment, education, recreation)
- Quality of life measures
- Goals of patient may differ from those of family, caretaker, and/or clinician
- Goals and expectations may change over time
- Health care constraints



NCMRR Model for Disability Research

Pathophysiology

Impairment

Functional Limitation

Disability

Societal Limitation



Pathophysiology:

Interruption of or interference with normal physiological and developmental processes



Impairment:

Loss or abnormality of cognitive, emotional, physiological, or anatomical structure or function -- including **all losses or abnormalities**, not just those attributable to the initial pathophysiology



Functional Limitation:

Restriction or lack of ability to perform an action in the manner within the range consistent with the purpose of an organ or organ system



Disability:

Inability or limitation in performing tasks, activities, and roles to levels expected within physical and social contexts



Societal Limitation:

Restriction, attributable to social policy or barriers (structural or attitudinal), which **limits fulfillment of roles** or **denies access** to services and opportunities that are associated with full participation in society



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Tuesday Night Poster Session

